

CLAIMS

1. A method of analysing tachometer and vibration response data from an apparatus having one or more rotary components, the method comprising the steps of:

5 providing vibration response data and corresponding tachometer data from the apparatus for a period over which a rotary component of the apparatus varies in rotational speed, the tachometer data being for that component;

repeatedly performing at intervals throughout the period
10 the sub-steps of:

determining a forcing frequency of the component from the tachometer data and a corresponding vibration response frequency of the apparatus from the vibration response data,

15 comparing the forcing and vibration response frequencies to determine the relative phase difference between the frequencies, and

determining the corresponding amplitude of the vibration response from the vibration response data; and

20 plotting the relative phase differences and vibration amplitudes on a polar diagram, whereby the plot trajectory is characteristic of the behaviour of the apparatus over the period.

2. A method according to claim 1, further comprising the
25 step of:

comparing the plot trajectory with a reference trajectory for a period in which the apparatus experiences the same variation in rotational speed.

3. A method according to claim 1 or 2, wherein the vibration
30 response data and tachometer data are acquired independently of each other.

4. A method according to any one of the previous claims, wherein the apparatus is a gas turbine engine.

5. A method according to claim 4, wherein the rotary component is a turbine drive shaft of the engine.

5 6. A method according to any one of the previous claims, wherein the tachometer data does not provide the absolute rotary position of the component.

10 7. A method according to any one of the previous claims, wherein the forcing and vibration response frequencies are compared in the time domain in order to determine the relative phase difference between the frequencies.

8. A computer system operatively configured to perform the method of any one of claims 1 to 7.

15 9. Computer readable media carrying computer code for performing the method of any one of claims 1 to 7.

10. A computer-program for performing the method of any one of claims 1 to 7.